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ABSTRACT

By exploring the kindergarten program found in two public elementary schools in a middle-class neighborhood in central Alabama, a study examined age at school entry as a critical factor in achievement in Alabama kindergartens. The sample consisted of 100 kindergarten students (53 boys/47 girls; 96 white/4 black)--77 were 63 months or older, and 23 were 62 months or younger; 67 had preschool experience, while 33 had no preschool experience. Both groups were exposed to the traditional kindergarten curriculum with computer-assisted instruction in readiness skills. The Pre-Reading Composite (Auditory Skill, Visual Skill, and Language Skill) subtest of the Metropolitan Readiness Test was used as the dependent variable; sex, age, and presence or absence of preschool experience were used as independent variables. Results indicated that the children did demonstrate differences in performance on the Auditory Skill subtest and were significantly affected by attendance at preschool. There was no significant difference in readiness achievement between older and younger children. Findings suggest that computer-assisted instruction may require caution in program material selection. (Tables giving descriptive statistics, a comparison of subtests by school and by preschool, and a comparison of age, preschool and interaction are included, and 13 references are appended.) (MM)

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Does Computer-Assisted Instruction Enhance the Reading Readiness Achievement in Students 5.2 Years or Younger?

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According to Alabama Kindergarten, the initial intent of kindergarten was:

1. The development within the child of a realistic self-image.
2. The development of the child's ability to communicate through the expression of his ideas and feelings.

From these beginnings in 1969, Alabama's kindergartens have evolved into the present skills oriented program found in the recent 1986 bulletin, Kindergarten, a detailed skills outline including subject areas and specific skills to be covered in the curriculum. Alabama's kindergartens reflect the national trend in kindergarten; spending more time on academics with a reduced emphasis on the social-emotional development of the individual child.

Nationally, concern has been expressed in the print media exposing the present trend of kindergarten and its academic slant. School administrators report pressure by parents whose children have spent two or three years in preschool to make kindergarten more academic. Parents wonder why after so much preschool why their child is still not reading. Public schools have countered with an increased exposure to mathematics, writing, reading, science along with computer-assisted instruction. Although this curriculum revision was easily achieved through a broadening of the common elementary school program, some educators worry about the consequences of such a program. Commonly mentioned worries include childhood stress, inappropriate subject presentation and behavior problems. The

concern for the welfare of the children has reached the point that in 1986 the National Association for the Education of Young Children released a position paper warning "that pushing young children too hard too soon could lead to "burnout" and "learning problems'. Across the country, many states are moving the age at entry requirement back to September from December. According to the National Association for the Education of Young Children such moves as changing the age at entrance as helping only a few. "By changing the cutoff date, you may save some of these kids but not all. It's just putting a finger in the dike". The solution most often mentioned involves a curriculum that allows each child develop at his own pace so that those who want to read can, while those who want to stack blocks can feel free to do that as well. Teachers willing to provide such learning environments are the key factor to curriculum development. Parents need to explore child development literature to better understand that what appears as mere play may be important development steps in the learning process.

This study examines age at school entry as a critical factor in achievement in Alabama kindergartens. This study explores the kindergarten program found in two public elementary schools found in a middle-class suburban neighborhood in central Alabama.

Review of Related Research

Since the fifties, kindergarten student achievement has been examined. Most recently, James K. Uphoff and June Gilmore have reported in Summer Children: Ready or Not For School, children born between June 1 and December 31 and begin school at their

first opportunity are more likely to fail that those children in the same age span who choose to enter school at a later time. In addition, Uphoff & Gilmore(1986) report that these youngsters have more social and emotional problems that those children whose birthdays fall between June 1 and December 31 but do not enter school at their first opportunity. In longitudinal studies, Uphoff(1984) found that seventy-five percent of children who experienced retention were those children who were entered at the first opportunity and their birthdays fell between June 1 and December 31. This group made up only twenty-two percent of the school age population of this study. The findings of Uphoff & Gilmore conflict with the earlier work of Miller(1957) which found that age was not a factor in school achievement if the younger children were 'bright'. These results reflect the opinion of that time that age was not a critical factor remembering that during this same era double promotion was common for the 'bright' child.

Longitudinal studies suggest increased achievement with the child's attendence of kindergarten. Howard(1986) found that in Mississippi, students who attended kindergarten showed an increased achievement level on nationally normed achievement tests, that those students who had not attended kindergarten prior to first grade entrance. It is important to note that when age is not an issue in the study, its absence may reflect a simplicity in the reported results even though school achievement is the common factor of concern. When age was a critical factor, Kinard & Reinherz(1986) found that younger students had the lower

scores on information processing while the older students had the highest scores. Once information processing was controlled for, no further differences existed in age groups. Although no differences existed beyond those stated, it is important to realize that all learning is information processing and such a stated difference may be critical. Janson(1974) found children older that 5.2 years at school entry scored higher than younger children at the beginning of the school year, but only in arithmetic achievement by the end of first greade. Most of the research findings demonstrates the need for further study due to methodological problems.

Methodology

Sample

The sample for this study was comprised of 100 kindergarten students, 53 boys and 47 girls. Of the sample, 96 are white, 4 are black; 77 are 63 months or older at school entry and 23 are 62 months or younger; and 67 had preschool experience while 33 had no preschool experience. Students were drawn from two public elementary schools located in a suburban neighborhood located in central Alabama. Both school abide by the Alabama State Department of Education guidelines for age at school entrance. All subjects were five years old on or before October 1. The socio-economic status of the sample can be classified as middle-class, based on the limited number of students who receive free or reduced lunches(less than five percent).

Through the demographic data and kindergarten achievement as measured on the Metropolitan Readiness Test critical factors will

be examined. This study is ex-post facto in nature since the evaluation of the progrm was undertaken near the completion of the school year. All students were guaranteed anonymity in the evaluation process. A limitation of this study is the lack of a control group.

Procedures

Each student was administered the Metropolitan Readiness Test, fifth edition, 1986, Level 2 in May, 1987 by the classroom teachers. Three subtests: Auditory Skill, Visual Skill and Language Skill were used to determine the reading readiness achievement of each student. The test publisher, The Psychological Corporation, has grouped these tests together referring to them as the Pre-Reading Composite. All tests were hand-scored in the hope of increasing the opportunity for each student to receive the highest schore possible. The tests required fine motor and visual acuity/perception to "bubble-the-dot". It was the desire of the researcher to allow each student to receive credit for correct responses which a machine-score might mistake as error. All scores were transformed to Normal Curve Equivalents(NCE) provided by the publisher. Validity and reliability were also reported by the publisher through the norming material provided. Reliability was established for the Pre-Reading Composite at .93 using the Kuder-Richardson formula. The teacher was asked to complete an accompanying class demographic sheet which asked for each child to be listed along with his/her age(in months), race, sex, and preschool experience(presence or absence).

Curriculums

Each school had a kindergarten curriculum program which included material provided by the state textbook committee, following the county's board of education timeline for instruction; supplemented by materials provided by local monies as proration made classroom funds unavailable for the 1986-87 school year. Curriculums of both schools included: music and physical education from trained instructors, art, along with an academic program with emphasis on phonetic reading readiness. Manipulates were a common part of each program. The computer-assisted instruction supplemented the traditional program in readiness skills and beginning math and reading material. Daily computer assess was found in one school while the other used the material as part of the weekly library program.

Data Analysis and Results

A 2 X 4 between-subjects multivariate analysis of variance was performed on the three dependent variables: Auditory Skill, Visual Skill, and Language Skill. The independent variables were sex (male, female), age (63 months or older, 62 months or younger), preschool experience (presence or absence) and school (school1 or school2). Race was eliminated from the study due to the very small sample found in this community.

INSERT TABLE 1 ABOUT HERE

Analysis was done using SPSS MANOVA(Norusis, 1985), unique

sums of squares approach. Using this approach ensures that any difference will be attributed to the summary statistic produced in the analysis. The subtests which comprise the Pre-Reading Composite of the Metropolitan Readiness Test, fifth edition, 1986, Level 2, were the basis for the analysis: Auditory Skill, Visual Skill, and Language Skill areas were used as the dependent variables; while sex (male, female), age (63 months or older, 62 months or younger), and preschool experience(presence or absence) were used as the independent variables. Assumptions were met after deletion of one outlier. This student had marked all possible answers.

To examine the differences in reading readiness achievement among the children several statistical procedures were used. First, initial differences between the two school groups were compared on the three subtests. Second, the three subtests were analyzed as dependent variables and the independent variables of age, sex, and preschool experience were compared. Examination of the two school groups reveals that the groups were significantly affected on the Auditory Skill subtest measure. According to the Pillais criterion, School yeilds an $F(3,96)=4.77$, $p=.004$, $\alpha=.13$.

INSERT TABLE 2 ABOUT HERE

To investigate the effects of each main effect and interaction on the individual dependent variables, the Roy-Bargman stepdown F-test was performed. All dependent variables were judged to be sufficiently reliable to warrant stepdown analysis. Results are shown in TABLE 4. The criterion for

significance is less than .05 on an experimentwise basis. Further examination of the data using the Roy-Bargman stepdown F-test reveal that once the effect of the Auditory Skill test [$F(1,98)=11.24$, $p=.001$] was removed from the analysis, the other subtest which shows significance at the univariate level, Visual Skill, was non-significant. Further comparison of the other independent variables along with School resulted in the inability to perform the MANOVA due to empty cells.

INSERT TABLE 3 ABOUT HERE

Further examination of the independent variables was performed without distinction of school identification to enlarge the cell size to follow the criterion established by Stevens for analysis using MANOVA. The only independent variable which demonstrated an effect on the only dependent variable of significance, Auditory Skill, was Preschool in the analysis when Age was the other independent variable in the interaction.

INSERT TABLE 4 ABOUT HERE

According to Pillais criterion, although no signficance was displayed in this interaction or in the independent variable Age, Preschool did demonstrate significance [$F(3,94)=3.76$, $p=.013$, $\alpha=.11$]. Using Roy-Bargman stepdown F-test for further examination revealed the significance of Auditory Skill [$F(1,96)=7.25$, $p=.008$, $\alpha=.07$]. With such weak eta square results, little utility is gained through this analysis.

INSERT TABLE 5 ABOUT HERE

Discussion

It would appear that the children did demonstrate differences in performance on the Auditory Skill subtest of the Metropolitan Readiness Test. It would appear that attending Preschool and being part of one school group made a difference in their performance in this area. Caution is advised in the interpretation of the results of the MANOVA analysis due to the unequal and disproportionate cell size found in the analysis. It is important to note that nonsignificance was found when the variables, Preschool and School were compared jointly. The factors affecting any unique differences between these school groups may result from factors not identified by the researcher for investigation.

Differences noted in the use of computer-assisted instruction did not appear to contribute to the rate of school achievement as measured on the subtests of the Metrpolitan Readiness Test as the school with daily computer-assisted instruction opportunities for the children had the lower scores on the test measures. Computer-assisted instruction appears to be very different in the two schools. Common computer-assisted instruction program material appears to range from common matching of objects based on similiarities or differences to more complex alphabetical ordering of letters and words. Curriculum opportunities included: counting, adding, subtracting, matching words to pictures. It appears that the availability of computer

diskette material was more critical than its appropriateness to the stated curriculum. Teachers indicated support for the use of such material and were proud of the achievement of the students to mastery of more advanced skill work.

Conclusions

Further study is indicated. Lack of power is the prime problem in the analysis. To i crease the power in this analysis an increase in sample size is suggested. Differences between the schools appears to warrant serious curriculum design study. Further examination of school2 would appear necessary with higher subtest scores found in those non-attenders of preschool. Investigation of the attending preschool group may shed important academic information about them individually which could prove useful to the classroom teacher as she plans instructional reading activities. These students have had enriched backgrounds attending preschool and public kindergarten yet had not mastered these basic skills. For success in first grade reading, care must be taken that sound-symbol correspondence is mastered for reading to develop. Further research investigation might include a more qualitative approach. Using participant observation could shed light upon the operation of these classrooms and teacher behavior leading to an increased understanding of the children and curriculum design now in place. Further quantitative research should include a control group. Care should be taken to identify the type and style of computer-assisted instruction used.

TABLE 1
Descriptive Statistics: Sex, Age and Preschool by School

SCHOOL	SEX		AGE(in months)		PRESCHOOL EXPERIENCE	
	BOYS	GIRLS	62 -	63 +	presence	absence
School1	35	25	14	46	46	14
School2	18	22	9	31	21	19
TOTAL	53	47	23	77	67	33

TABLE 2
A Comparison of Subtests by School

SCHOOL	SUBTEST	M	SD
School1			
	Auditory Skill	676.750	168.458
	Visual Skill	611.717	175.417
	Language Skill	633.617	193.667
School2			
	Auditory Skill	569.950	135.055
	Visual Skill	492.800	206.562
	Language Skill	589.525	178.290

TABLE 3
A Comparison of Subtests by School & Preschool

School/preschool group	Subtest	M	SD
School1			
with preschool	Auditory Skill	707.152	145.323
	Visual Skill	616.261	180.963
	Language Skill	646.935	200.721
no preschool	Auditory Skill	576.857	204.139
	Visual Skill	596.786	161.195
	Language Skill	589.857	167.550
School2			
with preschool	Auditory Skill	562.524	131.202
	Visual Skill	463.810	222.164
	Language Skill	500.000	200.062
no preschool	Auditory Skill	578.158	142.329
	Visual Skill	524.842	188.525
	Language Skill	633.211	143.401

TABLE 4
A Comparison of Age, Preschool & Interaction

independent variable	dependent variable	univariate F	df	stepdown F	df	a
Age						
	Auditory Skill	3.49429	1,96	3.49429	1,96	.016
	Visual Skill	.49035	1,96	.10291	1,95	.016
	Language Skill	.31143	1,96	.00343	1,94	.016
Preschool						
	Auditory Skill	7.24712*	1,96	7.24712*	1,96	.016
	Visual Skill	.00738	1,96	2.22812	1,95	.016
	Language Skill	.72408	1,96	1.64570	1,94	.016
A X P						
	Auditory Skill	1.27689	1,96	1.27689	1,96	.016
	Visual Skill	.09546	1,96	1.09382	1,95	.016
	Language Skill	2.70394	1,96	3.39070	1,94	.016

*P<.016

TABLE 5
Descriptive Statistics: Summary of Adjusted Sums of Squares & for Effects of Age, Preschool & their Interaction on Auditory Skill

source of variance	AUDITORY SKILL	
	SS'	∝
independent variable		
Preschool	181696.03	.07
Age	87607.20	---
P X A	32013.50	___
Error	2406863.40	
Total	2676166.6	

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"Does Computer-Assisted Instruction enhance the Reading Readiness Achievement in Kindergarten students 5.2 years or younger?"

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Alabama State Department of Education permits children to enroll in kindergarten if their fifth birthday falls on or before October 1. Many children are entered prior to their fifth birthday as the school year begins in September. Conflicting research is found in the literature as to the effect of age at entry on kindergarten reading readiness achievement.

The sample consists of 100 kindergarten students from two public elementary schools in a middle-class suburban community. Both groups were exposed to the traditional kindergarten curriculum with computer-assisted instruction in readiness skills. Of the sample, 53 are males and 47 are females; 96 are white, while 4 are black; 77 are 63 months or older and 23 are 62 months or younger; and 67 had preschool experience while 33 had no preschool experience.

Preliminary analysis was done using SPSS MANOVA(Norusis, 1985), unique sums of squares, regression approach, the pre-reading composite of the Metropolitan Reading Readiness Test, fifth edition, 1986, Level 2 was the basis for the analyses. The Auditory Skill Area, Visual Skill Area, and the Language Skill Area were used as the dependent variables; sex, age, and presence or absence of preschool experience were used as the independent variables. According to Pillais criterion, the dependent variable, Auditory Skill Area, was significantly affected by attendence at preschool, $F(3,94)=3.76$, $p=.013$. The results reflect a mild association between Auditory Skill and preschool, $=.11$. Results indicate no significant difference in readiness achievement between older and younger children. Some caution should be observed when judging these results due to the homogeneity of the sample and lack of a control group. The results suggest that computer-assisted instruction may require caution in program material selection.